

Determinants of HIV Retesting among People Living with HIV: A Cross-Sectional Study in the Northwest Region, Cameroon

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Abstract

Background: Retesters among PLHIV have been on the rise as countries work towards achieving HIV epidemic control. This has potential consequences in HIV programs including delayed ART initiation and duplication of HIV testing data. Context specific assessments are needed to inform mitigation actions. We aimed to assess the reasons and factors associated with HIV retesting among PLHIV. **Methodology:** This was a cross-sectional mixed methods survey among 800 conveniently sampled PLHIV in four high volume HIV clinics in the Northwest Region from 1st to 31st August 2023. We estimated the prevalence of retesting and elicited reasons for retesting. Chi-Square test was used to assess the relationship between retesting and the independent variables and logistic regression analysis in SPSS version 24.0 was used to identify predictors of re-testing. **Results:** Prevalence of retesting among participants was 26.6% with a higher prevalence observed among PLHIV in the urban setting (32%) compared to those in the rural setting (16%) and 53% of retesters had interrupted treatment in the past. Reasons for retesting included confirmation of cure after prayers 89 (39%), uncertainty about diagnosis 53 (24.9%), health worker request 31 (14.6%), perception of good health 28 (13.1%), confirmation of cure after suppressed viral load 9 (4.2%), premarital VCT 5 (2.3%), and confirmation of cure from alternative treatment 4 (1.9%). In bivariate analysis using chi-square age ($p = 0.04$), occupation ($p = 0.005$), level of education ($p = 0.019$), religion/denomination ($p = 0.002$) and facility setting

($p < 0.001$) were significantly associated with retesting. In multivariate analysis younger patients (21 - 40 years) were about 2 times more likely to retest, AOR = 1.9 (95%CI: 1.3, 2.7), while patients using a facility in an urban setting were about 3 times more likely to retest, AOR = 2.7 (95%CI: 1.8, 4.1). **Conclusion:** Retesting is more likely among younger PLHIV and those living in urban settings. Routine assessments to determine retesters will improve the quality of HIV testing data.

Keywords

HIV Retesting, People Living with HIV, Rural, Urban

1. Introduction

Effective and efficient HIV testing services constitute key steps in the HIV clinical cascade towards ending the AIDS epidemic [1]. WHO recommends that all forms of HIV testing adhere to minimum standards which include consent, confidentiality, counselling, correct test results and connection to treatment and prevention services [2]. High quality testing services can contribute to the early detection of HIV infection among the population, which can facilitate early access to treatment and prevention services [2].

Some people with an HIV diagnosis repeat their test many times, seeking confirmation while deferring anti-retroviral therapy and others retest following disengagement as countries get closer to controlling the epidemic [3]. Therefore, regular and continuous quality assessment of counselling and screening activities is needed to ensure reliability of HIV test results [2]. In sub-Saharan Africa, it is often difficult to estimate the percentage of people living with HIV (PLHIV) who are aware of their HIV status because neither the number of PLHIV nor the number of persons who have been diagnosed are directly counted [1]. Although the data for HIV testing services including testing outcomes is routinely collected in quality assurance registers and reported, there are scarcely systems in place to identify and remove duplicates coming from retested HIV positive persons [4] [5]. Between 2004-2022 various studies reported retesting rates ranging from 13% to 68% among PLHIV in SSA [4] [6]-[14]. Additionally, the proportion of first-time diagnosis among all positive tests has been dropping rapidly over time as countries progress towards achieving HIV epidemic control [1]. A recent study conducted in South Africa observed that although 50% of those testing positive for HIV had previously been diagnosed with HIV, only half of them disclosed prior knowledge of their status [4].

In a study conducted in Cameroon in 2017, a retester rate of 53% was observed among PLHIV in Cameroon [12]. This potentially has multiple consequences in HIV programs including delays in ART initiation, wastage of HIV test kits, misclassification of known positive patients as new diagnosis and duplication of

patient HIV testing data across multiple health facilities. Shortages in HIV test kits often constitute a significant barrier to the uptake of HIV testing services in Cameroon and the efficient use of these test kits has the potential of mitigating this barrier [12]. In order to reduce human errors in the diagnosis of HIV, Cameroon has been implementing the WHO recommendation for retesting for verification for all clients tested positive prior to initiation on ART as part of the national algorithm for HIV rapid testing [15]. This implies that for every HIV positive diagnosis, a minimum of 4 rapid test kits has to be used with potential implications on cost. By extension, a reduction in the proportion of persons with a previous diagnosis of HIV returning for retesting could invariably contribute to a more efficient use of test kits targeting mostly people who have no knowledge about their HIV status. Context specific assessments are needed to inform mitigation actions. To the best of our knowledge, only one study has previously reported on retesters among PLHIV in Cameroon [12]. Our study aimed to assess the reasons and factors associated with HIV retesting among PLHIV.

2. Methods

2.1. Study Setting

This was a multi-center study involving four large volume HIV treatment centers situated in four health districts (Bamenda, Bamenda 3, Ndop, Kumbo West) in the Northwest Region of Cameroon. These treatment centers include Regional Hospital Bamenda (Bamenda health district), Nkwen Baptist Hospital (Bamenda 3 health district), Ndop District Hospital (Ndop health district) and Banso Baptist Hospital (Kumbo West). Two of these districts (Bamenda, Bamenda 3) are located in urban settings and the other two (Ndop/Kumbo West) are situated in rural settings. Overall these sites have 14,473 PLHIV in care and treatment with the Regional Hospital Bamenda contributing 37%, Nkwen Baptist Hospital 31%, Ndop District Hospital 17% and Banso Baptist Hospital 15% of the total number of PLHIV receiving care in these sites [16]. Additionally, two of these are public facilities (Regional Hospital Bamenda, Ndop District Hospital) and the others (Nkwen Baptist Hospital, Banso Baptist Hospital) are faith-based facilities.

2.2. Study Design and Period

This was a uniform multicenter hospital-based cross-sectional mixed methods study conducted from August 1 to August 31, 2023.

2.3. Study Participants

It involved PLHIV that were currently enrolled in care and treatment in the selected sites.

2.4. Inclusion Criteria

PLHIV greater than 21 years that were currently active in care and treatment were included.

2.5. Exclusion Criteria

PLHIV that were mentally unstable.

2.6. Sampling

Four health facilities were purposively sampled to include 2 high volume treatment centers from an urban community and 2 high volume sites from a rural setting. Participants were selected by convenient sampling technique from each of the selected sites. The calculated sample size was distributed among the selected sites based on the proportion of clients receiving care in each facility. Participants were enrolled consecutively during their routine clinic visits in the selected health facilities if they met the eligibility criteria and gave their consent. Enrollment was done using a questionnaire containing an introductory script that normalized retesting behavior in order to minimize social desirability bias from potential participants. Furthermore, participant recruitment was integrated into the routine patient flow at the level of the nurses' and doctors' consultation rooms.

2.7. Sample Size Calculation

The formula for calculating prevalence in cross-sectional studies was used to calculate the sample size [17]:

$$n = \left[(Z_{\alpha})^2 P(1-P) \right] / d^2$$

where n = sample size,

α (type 1 error) = 0.05, critical value $Z = 1.96$,

P = proportion of PLHIV with a previous HIV diagnosis who repeat their HIV test = 50% [4],

d = precision. Assuming a level of precision of 4% and a confidence level at 95%, we calculated a sample size $n = 1.96^2 \times 0.5 \times (1 - 0.5) / 0.04^2 = 600$ PLHIV. An additional 10% was added to account for non-respondents, resulting in a minimum sample size of $n = (0.1 \times 600) + 600 = 660$. In order to further increase the power of the study the sample size was increased to 800.

2.8. Technique and Instrument for Data Collection

Data was collected using semi-structured questionnaires administered in the study sites during face-to-face interviews by trained interviewers in the participants' preferred language (English, Pidgin or Vernacular). The questionnaire contained 16 items under 4 main categories. The main categories comprised socio-demographic factors, clinical factors, retesting history and reasons for retesting. Under the sociodemographic factors, 8 items were included comprising, age, sex, occupation, level of education, religion/denomination, name of local congregation, marital status and facility setting. Clinical factors comprised 4 items including date of initial HIV diagnosis, duration on ART, history of treatment interruption and duration of treatment interruption. Retesting history consisted of 3 items which included retesting after initial diagnosis, date(s) of repeat testing and timing

of retesting in relation to treatment start date. Reasons for retesting consisted of 1 item on all possible reasons of retesting among participants. In order to improve the validity and reliability of the questionnaire it was piloted among 10 clients who did not participate in the survey and during this process ambiguous questions were identified and rephrased.

At the end of data collection, questionnaires were sorted out to check for errors and any missing information. Data double checking was done before analysis to ensure consistency, completeness and accuracy. Data from the questionnaires was entered into SPSS version 24.0 for analysis. Descriptive statistics were used to describe frequencies across socio-demographic characteristics and the reasons for retesting. Chi Square test was used to evaluate the relationship between the dependent variable (retesting history) and each of the independent variables (age, sex, marital status, level of education, occupation, denomination/religion, timing of retesting, duration of infection, duration on ART, facility setting) with 95%CI. Furthermore, a multivariate logistic regression model was built using variables that were found to be significantly associated with re-testing behaviour in bivariate analysis based on the chi square test. A p-value < 0.05 was considered statistically significant. Thematic qualitative analysis was conducted on the responses to the question on the reason(s) for retesting.

2.9. Ethics

This study was conducted after approval by the Northwest Institutional Review Board. Verbal and written consent were sought from all potential participants and the questionnaires were only administered to those that provided informed consent. Protection of patients' personal information was ensured by using only ART codes for data collection. All questionnaires were stored in a locked cupboard and information in electronic form was pass-warded. All data collected was kept confidential and only the study investigators had access to the patients' data.

3. Results

3.1. Cohort Description and Retesting History

Of the 800 participants included in this analysis, majority of patients 584 (73%) were older than 40 years with a median age of 51 years. Furthermore, most participants 573 (71.6%) were female whereas 227 (28.4%) were males. Additionally, majority of participants 710 (88.8%) were involved in blue collar jobs while 420 (52.5%) had just the primary level of education. Most participants belonged to at least one religious denomination with the Presbyterian 265 (33.1%) and Catholic 264 (33%) Christians accounting for the majority. Furthermore, most participants 533 (66.6%) were receiving ART in clinics located in urban settings whereas 267 (33.4%) were attending ART clinics in rural settings. The crude prevalence of HIV retesting was 26.6% while prevalence rates of 32% and 16% were observed among participants receiving ART in urban and rural settings, respectively.

In bivariate analysis using chi square, age ($p < 0.01$), occupation ($p = 0.005$),

level of education ($p = 0.019$), religion/denomination ($p = 0.002$) and facility setting ($p < 0.001$) were significantly associated with retesting. **Table 1** depicts the distribution of participants' characteristics overall and by retesting including p-values for chi square and odds ratios with their respective p-values in bivariate analysis using logistic regression.

Table 1. Demographic characteristics stratified on re-testing (N = 800).

Characteristic/Level	Descriptive statistics				Bivariable Analysis		
	Total		Retested		P Value	OR (95%CI)	P Value
	N = 800	%	N = 213	%			
Age group					0.04		
20 - 40	216	27.0%	74	34.7%		1.44	<0.01
>40	584	73.0%	139	65.3%		ref	
Sex					0.06		
Male	227	28.4%	51	24.9%			
Female	573	71.6%	162	76.1%			
Occupation					0.005		
Blue collar jobs	710	88.8%	178	83.6%		ref	
White collar jobs	90	11.3%	35	16.4%		1.7	<0.01
Level of education					0.019		
Primary	420	52.5%	97	45.5%		1.40	0.15
Secondary	263	32.8%	74	34.7%		1.8	<0.01
Postsecondary	118	14.8%	42	19.7%		ref	
Religion					0.002		
Catholic	264	33.0%	56	26.3%		2.79	0.19
Presbyterian	265	33.1%	71	33.3%		2.05	0.36
Baptist	118	14.8%	25	11.7%		2.65	0.22
Pentecostal	102	12.8%	43	20.2%		1.03	0.97
Muslim	44	5.5%	14	6.6%		1.61	0.57
Others	7	0.9%	3	1.4%		ref	
Duration (years) of HIV infection					0.206		
<1	17	2.1%	6	2.8%			
1 - 5	131	16.4%	30	14.1%			
5 - 10	248	31.0%	58	27.2%			
>10	404	50.0%	119	55.9%			

Continued

Duration (years) on ART					0.233		
<1	18	2.3%	6	2.8%			
1 - 5	138	17.3%	35	16.4%			
5 - 10	257	32.1%	58	27.2%			
>10	387	48.4%	114	53.5%			
Facility setting					<0.001		
Urban	533	66.6%	170	79.8%	2.4	<0.01	
Rural	267	33.4%	43	20.2%	Ref		

3.2. Predictors of Re-Testing

On multivariate analysis only age, $p < 0.01$, facility setting, $p < 0.001$ and religion/denomination, $p = 0.002$ remained significantly associated with retesting. Younger PLHIV (21 - 40 years) were about 2 times more likely to retest, AOR = 1.9 (95%CI: 1.3, 2.7), while PLHIV receiving treatment in a facility located in an urban setting were about 3 times more likely to retest, AOR = 2.7 (95%CI: 1.8, 4.1), **Table 2**.

Table 2. Outcomes of multivariate analyses.

Variable	Variables in the equation						95%CI for EXP (B)	
	B	S.E.	Wald	df	Sig.	Exp (B)	Lower	Upper
	Age	0.633	0.190	11.038	1	0.001	1.883	1.296
Occupation	-0.444	0.258	2.962	1	0.085	0.641	0.387	1.064
Level of education	0.070	0.186	0.143	1	0.705	1.073	0.746	1.543
Facility setting	1.004	0.206	23.749	1	0.000	2.730	1.823	4.089
Religion/denomination	-0.206	0.066	9.827	1	0.002	0.813	0.715	0.926
Constant	-0.479	0.673	0.508	1	0.476	0.619		

3.3. Timing of Retesting

Of the 213 participants who had a history of retesting, majority 178 (83.6%) had retested after ART initiation and just 21 (9.9%) had retested prior to ART initiation. **Table 3** depicts the timing of retesting relative to ART initiation.

3.4. Denomination/Religion of Retesters

Most retesters were Christians 196 (92%) and participants from the Presbyterian church comprised the majority of retesters, 71 (33.3%). Retesters from other

religions/denominations included catholics 56 (26.3%), pentecostals 43 (20.2%), Baptist 26 (12.2%), muslims 14 (6.6%). **Table 4** depicts the distribution of retesters by denomination/religion.

Table 3. Timing of retesting.

Timing of retesting	Number of retesters	Proportion of retesters
Prior to ART initiation	21	9.9%
After ART initiation	178	83.6%
Before and after ART initiation	14	6.6%

Table 4. Denomination/religion stratified on retesting (N = 213).

Religion/Denomination	History of retesting	
		Yes
Catholic	Number	56
	% with History of retesting	26.3%
Presbyterian	Number	71
	% with History of retesting	33.3%
Baptist	Number	26
	% with History of retesting	12.2%
Pentecostal	Number	43
	% with History of retesting	20.2%
Muslim	Number	14
	% with History of retesting	6.6%
Others	Number	3
	% with History of retesting	1.4%

3.5. Treatment Interruption and Retesting

Of the 213 retesters majority 113 (53.1%) had interrupted ART in the past (**Table 5**).

Table 5. Treatment interruption and retesting.

Interrupted treatment	Number of retesters		Proportion
	Yes	No	
Interrupted treatment	Yes	113	53.1%
	No	100	46.9%

3.6. Reasons for Retesting

Majority of participants 83 (39%) had retested in order to confirm HIV cure after prayers. Out of these 28 (41%) were Pentecostal, 19 (28%) Presbyterian 12 (18%) Catholic, 9 (13%) were Baptist. **Table 6** depicts the distribution of reasons for retesting.

Table 6. Reasons for retesting.

Reasons	Number of retesters	Proportion
Confirmation of cure following a suppressed viral load	9	4.2%
Confirmation of cure after prayers	83	39%
Not sure of a positive diagnosis	53	24.9%
Premarital VCT	5	2.3%
Perception of good health	28	13.1%
Request by health worker	31	14.6%
Following alternative treatment	4	1.9%
Total	213	100%

4. Discussion

To our knowledge, this study represents the largest study on retesting and reasons for retesting among PLHIV that compares retesting levels in both urban and rural settings in Cameroon, a country that has about 494,476 PLHIV [18]. We found a high crude prevalence of retesting (26.6%) in PLHIV receiving routine care at four high volume HIV clinics in four health districts in the Northwest Region with a higher prevalence observed in the urban setting (32%) and a relatively lower prevalence observed among participants in rural settings (16%). This high prevalence was largely driven by risk factors such as religion, facility setting, and age. Our findings extend to the population of PLHIV in SSA at large and are consistent with other findings in SSA that suggest that an increasing number of people testing positive for HIV have previously received an HIV diagnosis [4]. In a recent modelling study involving 183 population based surveys and national testing programs in 40 countries in SSA the proportion of retesters increased from 11% to 58% between 2000-2020 [1].

4.1. Prevalence of Retesting

Between 2004-2018 various studies reported retesting rates ranging from 13% to 68% among PLHIV in SSA [4] [6]-[8] [11] [13]. In a recent retrospective study conducted in South Africa using a digitally based surveillance system with unique patient identifiers it was observed that although 50% of those testing positive for

HIV had previously been diagnosed of HIV only half of them disclosed prior knowledge of their status [4]. In a similar cross-sectional study conducted in Ethiopia a retester prevalence of 13.2% was observed among participants interviewed within 2 weeks of ART initiation [11]. This relatively lower rate of retesting could have been due to a potentially higher level of social desirability bias among clients newly enrolled in care and treatment and the absence of a digital surveillance system with unique identifiers.

Although the retester prevalence of 53% [12] previously reported in Cameroon was about 2 times higher than the level observed in our study it could be related to the fact that this earlier study was conducted in 2017 prior to the effective implementation of the test and treat policy [19]. Prior to this period Cameroon was implementing the 2013 WHO guidelines on ART initiation and newly diagnosed adult clients were enrolled based on CD4 thresholds and clinical staging causing significant delays in initiating ART. This could have resulted in many more clients being retested over time as a step towards re-engagement in care. However, the crude prevalence of 26.6% that we observed in our study may actually be lower than the true level of retesting among PLHIV in the Northwest Region because it was a cross-sectional study based on patient interviews and thus prone to some degree of social desirability bias. A digital unique patient identifier registration system that can track retesters is yet to be introduced in the health system in Cameroon. Drawing lessons from a recent similar study in South Africa [4] a digital surveillance system using unique identifiers is likely to detect higher levels of retesting in our setting and this would help in reporting more accurate data on HIV new diagnoses and potentially improve detection and linkage of unlinked known positive cases on ART.

Furthermore, the higher prevalence of retesting (32%) observed among participants receiving care in urban facilities could be related to the presence of relatively more influencers like religious leaders that make claims on curing PLHIV and who often ask their followers to retest in order to confirm that they have been cured.

4.2. Timing of Retesting and Treatment Interruption

Majority of retesters (83.6%) had retested after ART initiation. HIV is a chronic infection and though the effectiveness of ART has greatly improved over time with many benefits including zero sexual transmission when a PLHIV achieves an undetectable viral load ($U = U$), a cure is yet to be discovered and viral suppression depends on good adherence on ART. In the absence of allopathic cure some PLHIV combine un-orthodox therapies that are sometimes associated with claims of having curative properties by vendors of these products. Furthermore we observed that 53% had interrupted treatment for various durations suggesting a possible relationship between treatment interruption and retesting that could be the subject for further research. Additionally though only 9.9% of participants in our study reported to have retested prior to ART initiation previous studies have

demonstrated that HIV testing after an initial positive HIV result is an important cause of delays in ART initiation [1] [9]-[11]. This is often a coping attitude towards accepting the outcome of the test [20]. To decrease retesting and reduce the delay in ART initiation, efforts could focus on increasing the acceptance of positive HIV results by providing more information on the process of testing during counselling including the U = U message and the importance of early ART initiation.

4.3. Predictors/Reasons for Retesting

We found that younger age (21 - 40 years), blue collar jobs, primary level of education, religion/denomination and urban facility setting increased the odds of retesting (Table 1 and Table 2). In a recent systematic review involving 46 studies in SSA younger age was reported to be associated with lower ART linkage rates due to stigma among other factors [21]. Previous studies have also demonstrated that HIV retesting contributes significantly to delays in ART initiation as a means of coming to terms with their diagnosis [1] [9]-[11]. High levels of stigma among younger adults may account for the higher odds of retesting observed in our study and targeting young people with U = U messages could potentially reduce stigma, reduce retesting and improve ART linkage rates in this population. Though the earlier study on this subject in Cameroon [12] reported higher odds of retesting among secondary or higher levels of education in Cameroon, our observation of higher odds among participants with primary level of education could reflect challenges in adapting or communicating counselling messages in simple terms or properly translating HIV counselling messages for better comprehension by the less educated in the community especially in the rural areas. Consequently, the translation of positive HIV counselling messages such as the U = U message could potentially lead to a decrease in retesting. One of the limitations of the earlier study on this subject in Cameroon [12] is that it did not explore possible associations between retesting and predictor variables such as age, facility setting, religion and type of job. Furthermore, the reasons for retesting were not explored.

Our finding of higher odds of retesting among participants with a religion is similar to recent findings reported in Eswatini where significantly higher odds of retesting were observed among participants with a religion (OR = 2.3, CI 95% = 1.2 - 4.7), [14]. This could be related to the influence of faith healers on positive patients that may result in some PLHIV redoing an HIV test to confirm spiritual cure.

Based on our literature search, we did not find any previous study that explored the relationship between ART clinic facility setting and retesting. However, the higher odds of retesting observed in our study among participants receiving care in urban settings could be the result of relatively more influencers in urban settings compared to rural settings. Our study was conducted in the Northwest Region of Cameroon where there is an ongoing armed conflict that has led to many internally displaced people moving from rural areas to urban areas that have been

relatively safe. This has also come with the eruption of many churches that promote faith healing and vendors of products that are marketed as potential cures for HIV. These multiple influencers may be playing a significant role in retesting behavior among PLHIV as well as delaying linkage of PLHIV to ART or re-engagement to care and treatment after interrupting treatment. We also observed higher odds of retesting among participants involved in blue collar jobs and though it is not yet clear what may account for this, further research on this topic could possibly shed more light on this behavior pattern.

The most frequent reasons for retesting were those regarding the hope of having a negative outcome or cure (45.1%) after alternative interventions like prayers, food supplements/traditional medicine or having a suppressed viral load. The observation of PLHIV retesting because of a suppressed viral shows gaps in communication of viral load results. There is therefore the need to strengthen the capacity of healthcare workers on proper communication regarding the significance of suppressed or undetectable viral load to PLHIV and the community at large. Although this observation was also reported in a recent similar study in Eswatini [14] a very minimal proportion of participants (1%) had retested on account of this. Conversely, previous studies in SSA countries showed that majority of participants had retested because of not being sure or not accepting a positive test result [1] [10] [14]. This difference between our studies could be because majority of participants in our study had been on treatment for more than one year whereas majority of participants in other studies involved newly initiated within 2 weeks of treatment. The implication is that the reasons for retesting among these participants might have been skewed reasons that apply to treatment naïve positive PLHIV. Not being sure of a positive test result or non-acceptance of a positive test result was the second (24.9%) most important reason in our study. This also underscores the importance of strengthening HIV counselling services. These could potentially lie in testing counsellors providing more information about the process of HIV-testing and the importance of early ART initiation. During counselling, people could be made more aware that a confirmation test already took place before they got the results and in case they still want to retest for confirmation, they could be offered one immediately at the health facility [14]. In order to improve the effectiveness and efficiency of identifying retesters, efforts could be made to implement a nationwide digital medical registration. This will help pick potential retesters and use the opportunities to counsel towards engagement or re-engagement to care and treatment.

Request by a health-care worker was another important reason observed in our study and this sometimes happens when PLHIV change health facilities, return to the facility after very long periods of treatment interruption (a challenge that could be addressed by a nationwide digital medical registration) or get tested without their knowledge. Ensuring that the patient flow in health facilities guarantees that all clients that have an HIV test request pass through counselling services and give their consent before the test is done could reduce retesting in this category.

However, some previous studies found significant associations between retesting and factors for which no significant associations were found in this study, for example, one study in Eswatini reported associations between retesting and marital status as well as time since first HIV diagnosis [14] while a similar study in Ethiopia observed association between retesting and having children [11].

5. Limitations

A possible limitation of this study is the fact that retesting is a sensitive issue and therefore subject to social desirability bias. However, in order to reduce this bias, the questionnaire was designed with a script that normalized this behavior during the interviewing and probably increased the chances of getting accurate responses from participants. Furthermore, residual confounding could remain. Potential factors such as patients' socioeconomic status, mental health, or access to information that could have influenced both retesting behavior and the studied variables were not considered. Because studies on retesting are scarce, there are possibly potential confounders that are still unknown. Finally the convenient sampling method limits the extent to which the findings could be generalized.

6. Conclusions

We found a high crude prevalence of retesting among PLHIV in our setting with the prevalence in the urban setting double the level observed in rural settings in the Northwest region of Cameroon. The significant differences in HIV positive retester prevalence rates both in our study and across countries indicate that the proportion of people retesting is context specific. Our findings demonstrate that beyond just delaying ART initiation on ART, retesting among PLHIV is also an important factor to consider among PLHIV interrupting ART. Furthermore, the most frequent reason for retesting in this study was the hope of having a negative test outcome or cure after prayer therapy. There is therefore the need to identify and engage all community influencers especially religious leaders for sensitization on stigma-reduction messages such as the U=U message. Quality improvement projects aimed at reducing retesters in health facilities also have the potential to identify and re-engage retesters in care.

What is already known about this topic?

- Retesting and subsequent delays in ART initiation remain a barrier to achieving additional gains in HIV prevention and control.
- Retesting prevalence is context specific and will continue to be an important factor to consider in HIV testing data quality as countries get closer to epidemic control.
- Deduplication of HIV testing data through removal of retesters is needed for high quality HIV testing data and a nationwide digital medical registration system has the potential to make this process more effective.

What this study adds?

- It adds to the scarce body of evidence on retesting in Cameroon and SSA.

- In addition to the only published study on this topic in Cameroon, it takes a deep dive into reasons that drive retesting among PLHIV.
- It also demonstrates that apart from delaying ART initiation, retesting among PLHIV is an important factor to consider among PLHIV that are interrupting ART.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix. Questionnaire on Determinants of HIV Retesting Among PLHIV

ART CODE.....

People who are on HIV treatment or have tested positive in the past sometimes may go to the hospital to be retested for various reasons. In order to improve the quality of services to our clients, we have begun asking all our clients about reasons for retesting. Your responses will be kept confidential and whether you participate or not, it won't affect the services we offer to you.

I. DEMOGRAPHICS

- 1) Age (years): _____
- 2) Sex (M/F): _____
- 3) Occupation: _____
- 4) Level of education: (1) Primary (2) Secondary (3) Post-secondary
- 5) Religion/denomination: (1) Catholic (2) Presbyterian (3) Baptist (4) Pentecostal (5) Muslim (6) Other (Specify) _____
- 6) Name of local congregation: _____
- 7) Marital status: (1) married (2) cohabiting (3) never married (4) divorced/separated (5) widowed
- 8) Facility setting: (1) Urban (2) Rural

II. CLINICAL FACTORS

- 1) When were you first diagnosed with HIV? (DD/MM/YYYY) _____
- 2) For how long have you been on treatment? (1) <1 year (2) 1 - 5 years (3) 6 - 10 years (4) >10 years
- 3) Have ever stopped taking your ART? (1) Yes (2) No (NB: information to be verified in clients' files)
- 4) If yes, for how long was treatment stopped? (1) 1 month (2) 2 months (3) ≥ 3 months

III. RETESTING HISTORY

- 1) Have you ever repeated your HIV test since your first diagnosis? (1) Yes (2) No
- 2) If yes,
When was it done? (DD/MM/YYYY - State dates in chronological order if multiple retesting was done) _____

- 3) What was the timing of retesting in relation to treatment start date? (1) Prior to initiation (2) After initiation (3) Both

IV. REASONS FOR RETESTING

State reason (s) for retesting. NB (elicit detailed information about any influencers that are identified for subsequent engagement)
